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STATE OF MONTANA

DEPARTMENT OF STATE LANDS

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HELENA 59601

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May 17, 1979

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Office of the Governor
Capitol Station
Helena, Montana 59601

Environmental Quality Council
Capitol Station
Helena, Montana 59601

All other commenting or consulting parties

LEO BERRY, JR.
COMMISSIONER

Attached are the comments received by the Department of State Lands on the Draft Environmental Impact Statement for the proposed Zortman and Landusky Mining Companies mines and heap leaching operations near Zortman and Landusky Montana. Also Attached are the comment responses prepared by the Department.

A review and consideration by the Department of the comments received, and additional data available since the issuance of the draft EIS has not altered significantly the results and conclusions reached regarding the significance and magnitude of the potential impacts identified in the draft EIS. Because of this, the Department of State Lands has determined that it will not be necessary to compile a final environmental impact statement as provided for by MAC 26-2.2(18)-p290 (Rule V)(2)(a) and (b). Pursuant to this rule, the Department plans to make its decision on the applications by the Zortman and Landusky mining companies not less than fifteen (15) days after sending copies of this document to the Governor of Montana, the Montana Environmental Quality Council, the mining companies, and all other commenting or consulting parties. To assure compliance with the requirements of the Hard Rock Law, the operation, if approved, will be inspected by the Department four times annually. A \$530,000 bond is being required by the Department (\$256,000 - Landusky Mining Company) (\$274,000 - Zortman Mining Company) to assure reclamation of the mines and processing sites.

Attachments

cc: Zortman Mining Company Inc.
Landusky Mining Company Inc.

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RECLAMATION

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PHONE (406) 449-2001

HELENA, MONTANA 59601

March 15, 1979

Ralph Drier, Environmental Administrator
Department of State Lands
Helena, MT 59601

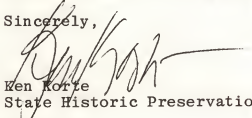
RE: Zortman/Landusky
draft EIS

Dear Ralph:

Thank you for consulting with this office regarding the treatment of cultural resources in the above EIS. The draft statement adequately addresses the known cultural resources in the study area, and I would concur with the proposed mitigating measures outlined on pages 119-120.

At this time, the Zortman/Landusky area does not appear to meet the National Register criteria for nomination as a Historic District, but future historical and archaeological studies may provide additional documentation to justify considering the mining area as a National Register Historic District.

Sincerely,


Ken Korte
State Historic Preservation Officer

KK:PB:pb





LAZY 69 CATTLE CO.

Henry Nesbit
Grace A. Nesbit

Box 896
Malta, Montana 59538
(406) 673-4450 4285
Zortman, MT
59546

Terry Nesbit
JoAnn Nesbit

Ralph Driear
Environmental Administrator
Dep. of State Lands
Capitol Station
Helena, MT 59601

Dear Sir,

I would like to correct two statements and add a comment concerning the DEIS on the proposed plans of mining for Zortman area. We are residents of Zortman, own the Buckhorn store & cabins and a ranch 35 east in Phillips Co.

- A** 1. Page 65 b. Enrollments. 2nd paragraph:
Enrollment in the Malta Elementary School is 345 - 24 students per teacher.
- B** 2. Page 65 b. Enrollments last paragraph:
Malta's high school..... averages 17 high school & Jr. Hi. students per teacher, an enrollment of 380.

C Also we did not see any mention of the post office in Zortman, which we feel is very important to the community. Information can be obtained by calling 673-4382, Rick Tuttle, Officer in Charge.

yours truly,
Mrs. Henry Nesbit



Response to Grace Nesbit Letter

A. The office of the Phillips County Superintendent of Schools was again contacted regarding elementary school enrollment. The office reaffirmed official elementary school enrollment to be 307 pupils. The office, however, indicated that unofficial enrollment was higher.

B. The disparity between the high school enrollment figure of 278 used in the draft EIS, and the 380 students referred to in Mrs. Nesbit's letter can be explained by the 97 intermediate school students not included in the high school enrollment figures.

C. The Zortman Post Office is located in the Buckhorn Store within the Townsite. Postal service information was obtained from Rick and Mavis Tuttle and was one of the methods used to estimate the current population of the Zortman area. In small communities, a post office often serves an important social function, providing a focal point for exchange of local news and other communications. Projected population growth in the Zortman area is not expected to substantially change the character of postal service in Zortman.

Since the issuance of the draft EIS for the proposed Zortman and Landusky mining projects, however, additional updated information pertaining to population increase anticipated in the general area as a result of other developments has become available. Employment in the American Colloid bentonite operation near Malta is now expected to be significantly higher and occur more rapidly than predicted in the draft EIS. Additionally, employment in natural gas fields in the northeastern portion of Phillips County is expected to increase. As a result, Table III-1 on page 88 of the draft EIS containing population projections for Phillips County, 1970-2000, has been updated to reflect the additional population increases and is presented below. Additional changes in the text as a result of the new projections are also listed below. The increase in population and impacts as a result of the proposed mining projects remains as discussed in the draft EIS.



Table III-1. Population Projections-Phillips County, Montana
1970-2000 (John Short and Associates, 1979).

	1970	1978	1980	1985	1990	1995	2000
Scenario 1 Permits Denied	5386	5500	5683	6180	6319	6461	6607
Scenario 2 Mining 1000 TPD*	5386	5500	5701	6208	6328	6479	6616
Scenario 3 Mining 3000 TPD*	5386	5500	5701	6265	6406	6505	6698
Scenario 4 Mining 500 TPD*	5386	5500	5701	6322	6551	6619	6759

* at each
operation

Page 89:

Previous: "In the Malta area competition for labor is likely to be great, as American Colloid Company will be filling 110 jobs by the early 1980's".

Revised: "In the Malta area competition for labor is likely to be great, as American Colloid Company will be filling 150 jobs by the early 1980's".

Page 99:

Previous: "Bentonite mining could add as many as 75 additional students to the systems".

Revised: "Bentonite mining could add as many as 196 additional students to the systems".

Previous: "The Malta Elementary Schools could experience a cumulative enrollment increase of 47 students".

Revised: "The Malta Elementary Schools could experience a cumulative enrollment increase of 96 students".

Previous: "The High School would have 51 new students".

Revised: "The High school would have 150 new students".





United States Department of the Interior

1793

BUREAU OF LAND MANAGEMENT

Phillips Resource Area
Box B
Malta, Montana 59538

March 19, 1979

Mr. Ralph Driear
Environmental Administrator
Department of State Lands
Capitol Station
Helena, Montana 59601

Dear Mr. Driear:

Our review of the Draft Environmental Impact Statement for the proposed mining plan of Zortman and Landusky Mining Operation was made with a primary view toward impacts that would affect the public lands adjacent to the patented mining lands. Our comments are referenced by page number.

A Page 35. b. Surface Water Quality

Error: Acid mine drainage problem in Montana Gulch and Rock Creek should more correctly be identified as arsenic. Table II-3 on page 37, indicates that the Gold Bug Adit Discharge has a PH factor of 6.7 which is nearly neutral and a PH of above 8 at two points on Rock Creek. Our studies indicate high concentration of arsenic flowing from the Gold Bug Adit present at Montana Gulch Campground.

B Page 36. c. Groundwater Quality

Comment: Arsenic in the surface water is believed to be affecting the groundwater quality of a well drilled at Montana Gulch Campground. Analysis of water from this well revealed high concentrations of arsenic than health standards allow for human consumption. The recreational value of the Montana Gulch Campground is severely limited due to the lack of potable water. The water discharged from the Gold Bug Adit, with its high concentration of arsenic, has an extremely negative impact on the Montana Gulch Campground and all landowners downstream from the mining area.

Page 47. 2. Fish

Suggested Addition: There are brook trout in Beaver Creek.

Page 49. c. Mammals

Omission: There is a large colony of hibernating bats in caves in the Little Rocky Mountains. Information is available on these bats.





Page 51. (d) Bighorn Sheep

Comment: Bighorn sheep could be affected by the mining operation, however, little is presently known about the herd. The Montana Fish and Game Department plans to study the sheep herd in the summer of 1979. They may present further recommendations on the management of the herd, especially if the mining area is expanded onto public lands.

Page 59. (2) Zortman and Landusky Area

Error: A statement is made that the Zortman townsite is plotted into many small irregular shaped lots totaling approximately 80 acres and most of this land is vacant. Approximately 29 acres of land in Zortman is privately owned, the remainder is in public ownership administered by the BLM. These public lands are not open for development due to the Ruby Gulch floodplain.

An omitted problem is the periodic flooding caused by high intensity rainstorms which also wash mine tailings into Zortman. Past mining activities resulted in tailings which presently choke two drainages in the mountains and these tailings are being moved by water from the patented mining claims to adjacent public and private lands. This is a residual negative impact on water quality, recreation, the Zortman townsite and a visual intrusion.

Page 72. 14. Recreation

Omission: Fishing for brook trout in Beaver Creek should be added. There is no mention of proposed road closures by the mining company. Road closures would have a negative impact on recreation. Traditional uses of roads in the area include hunting and fishing access, sightseeing, driving for pleasure, rock hounding and bike and horse riding. Road closures could create a defacto wilderness area leaving access to much of the Little Rockies only from the Fort Belknap side of the mountains. Proposed road closures along with public safety considerations due to the lack of closures are impacts that need to be addressed.

Page 72. 15. Visual Resources

Omission: Apart from the area disturbed by mining activities the Little Rockies has a class II Scenic rating which is the highest rating found in Phillips County. The natural beauty of the mountains is an important aspect on which mining activities has and will continue to have an extremely negative impact. Other natural phenomena omitted that add to the visual resource of the mountains include rock needles, spires and hole-in-the wall.

Page 72. 16. Wilderness Values

This section omitted. Comment: At the present time the Bureau of Land Management is conducting an inventory of all public lands for wilderness considerations. There are three wilderness inventory units identified for study within the Little Rockies.



Page 80. Groundwater

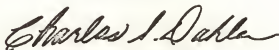
D Comment: The BLM maintains a forest fire station and crew at Zortman during the fire season and is dependent on the local water source for their purpose. Based upon the statement that no feasibility study has been conducted to determine if adequate groundwater exists for use by both the proposed operations and the residents of Zortman and Landusky, such a determination needs to be made for possible impact on the station, crew, and continued availability for fire protection.

Page 116. 8. Terrestrial Fauna (3)

Comment: Hunting inside the permit boundary can be controlled by the mining company. Hunting on public lands outside the boundary is controlled by the Bureau of Land Management. It would be necessary to petition the BLM for closure on areas outside the permit boundary.

We certainly appreciate the opportunity to comment on the draft EIS and trust our suggestions will be given due consideration in the final EIS.

Sincerely yours,



Charles S. Dahlen
Area Manager



Response to Bureau of Land Management Letter

A. The term acid mine drainage was used as defined by the EPA (Scott and Hays, 1975, EPA Report 440/g-75-007). The Gold Bug adit effluent has some characteristics of an acid drainage (high sulfate, iron and zinc and pH less than 7.0) but it also could be considered a poor quality groundwater with a high arsenic concentration. The pH of Rock Creek reflects a significant dilution of upper Rock Creek water by high quality water from springs on the Kolczak Ranch and is not characteristic of the Montana Gulch water.

B. The proposed mining activity would divert a small amount of effluent from the Gold Bug adit for use in the leaching process, thus causing a slight reduction in flow in Montana Gulch. The proposed mining operation is anticipated to have no other impacts on either, the quantity or quality of water in Rock Creek. Arsenic values present in the adit discharge are thought to be possibly originating from previous mining contact with the sulfide ore zone, as arsenic is a mobil ion associated primarily with sulfide mineralized zones.

The two ranchers on Rock Creek downstream from Landusky were contacted concerning existing impacts of Gold Bug adit discharge on their property. Both these ranchers stated there were no significant impacts on their land from this water (F. Kolczak, telephone communication, April 5, 1978 and Larry Kipp, telephone communication, April 6, 1978).

C. The Zortman and Landusky Mining Companies are presently negotiating with the Phillips County commissioners and the BLM regarding the development of road construction, road closures, and public access routing through the mining properties. Following a finalization of these plans, an open meeting will be held by these parties to receive public input to the proposals regardless of the potential plans for any road closures, the mining companies have indicated that alternate access into the public lands will be provided to the extent that it exists presently, i.e. access to public lands would be neither reduced nor increased as a direct result of road closures for the mining projects (Hank Scholz, pers. comm.).

D. The infiltration gallery water system in Alder Gulch supplied the previous mine and mill complex near Zortman and provided water to an estimated 50 to 60 families in Zortman. No shortages of water occurred in Zortman during this activity. Water demands from this previous mining and milling operation were greater than proposed in the current mining program and the community population is anticipated to be less. Based on this information it can be reasonably expected that all water requirements can be met by available groundwater supplies without adversely affecting other users. The planned water use from the Alder Gulch source will take advantage of an existing groundwater appropriation for mining at that site. Other existing water rights such as the existing appropriation that provides domestic water to the BLM fire station and some Zortman residents are protected from additional groundwater appropriations for mining by Montana water rights laws (Ed Scholz, pers. comm.).



Office Memorandum

STATE DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES

TO : Ralph Driear, Dept. of State Lands

DATE: March 26, 1979

FROM : Fred Shewman, Water Quality Bureau

Fred Shewman

SUBJECT: Landusky-Zortman Draft EIS Comments

Page 77 says the pregnant and barren ponds may receive runoff from disturbed lands peripheral to the ponds. We think it is very important to design these chemical-containing ponds so they don't collect any more runoff water than the direct precipitation on the ponds and leach pad.

A

I am not too clear on what storm event the chemical ponds are designed to contain without overflow. I feel the chemical ponds ought to contain the 100-year precipitation event at a minimum. Even that has an 18% chance of being exceeded at least once in 20 years, and the 10-year event has an 88% chance.

The EPA is proposing hazardous waste regulations which may require special disposal considerations for sludges or residues from the chemical ponds.

wa



Response to Fred Shewman, Water Quality Bureau, letter

A. In addition to the construction of the leach pads and ponds, the disturbance of a small area adjacent these facilities is necessary to provide material to construct the ponds and make berms to divert runoff from undisturbed lands. To protect the small drainage downstream from the ponds and pads, runoff from the disturbed areas is diverted to the ponds. The ponds will be designed and operated to contain a 100 year, 24 hour precipitation event, from all disturbed areas, and facilities (rip-rapped bypass, spillway, or emergency storage pond) will be provided to handle larger precipitation events without causing pond damage (Max Botz, per. Comm.).





March 27, 1979

Mr. Ralph Driear
Environmental Administrator
Department of State Lands
Capitol Station
Helena, Montana 59601

Dear Ralph:

We have reviewed the draft environmental impact statement for the gold and silver mines proposed near Landusky and Zortman. It seems apparent that the potential social and economic impacts of the projects cannot be precisely described because of some of the key variables cannot be accurately forecasted at this time. The most important of these is the number of workers that will be hired from the adjoining area. The EIS indicates that the companies would prefer to hire as many local people as possible. However, it points out that this goal may not be realistic because the local labor pool is small and its potential for filling mining-related positions has nearly been exhausted by the American Colloid bentonite development near Malta. Without the ability to establish the approximate number of local workers hired it becomes extremely difficult to effectively predict the need for housing, the location of residential development and the associated water and sewage facilities.

A The statement's conclusion that Zortman is probably the most viable option for settlement (page 93) is reasonable, though the suitability of Zortman is constrained by its inadequate water supply. The EIS does not make clear, however, how this conclusion meshes with the mining companies' plans to locate five homes on land they own in Landusky. The EIS states that "further land acquisition is anticipated." (Page 10) Would this be in Landusky or in Zortman? Table III-4, "Projected Settlement Distribution," (page 93) allocates 70 persons and 27 dwelling units to Zortman and 40 persons and 15 dwelling units to Landusky. The only basis for this allocation seems to be that "if Zortman can improve its water supply it will logically attract the majority of new settlement." The "if" in this case is a critical unknown. Because of the uncertainties involving the number of local workers





hired and the location of residences for the workers, it appears that the county will have to assume a reactive posture in dealing with the mining development until more accurate information regarding these issues becomes available. If the Landusky and Zortman mining applications are approved we would be willing to assist the Phillips County Commissioners and area residents in investigating the feasibility of providing an improved water supply for Zortman.

The EIS suggests, as a mitigating measure for school impacts, that the school districts in Phillips County be reorganized so that the districts which experience increased enrollments will also receive increased revenue. Based on the information provided in the EIS, this seems to be the most equitable and rational means of dealing with this problem. Since the Landusky students do not appear to have reasonable access to the Dodson High School throughout the school year it would seem to make sense to redraw the district boundaries so that the taxes paid by local families go to the schools their children actually attend. The same problem seems to exist for students in the Malta elementary school district who attend Robinson School. Only the local authorities can determine whether a boundary realignment is politically feasible but if it is to be done it should be done before the school districts become dependent upon the increased revenue from the mining operations.

B According to the EIS "perhaps the major adverse impact that cannot be avoided is the potential threat of the introduction to the area's surface and groundwater system of potentially hazardous substances...." The final EIS should clearly articulate those measures which will be taken to minimize this potential threat. Because Zortman is proposed as the "most viable" site for residential development for mine workers and their families, and because groundwater in the Zortman area is unusable for domestic purposes (page 64), it is imperative that adequate measures be taken to assure that surface drainage from the mining operation be provided in such a manner as to prevent hazardous substances from affecting any potential source of potable water. Pages 76-79 of the text indicate that the concern about chemical contamination of the area's surface and groundwater is legitimate. On page 197, the EIS states that, "If a spill or seepage of process reagents or residues were to result in the contamination of the groundwater supplies currently used for human consumption in Landusky and Zortman, the commitment of this resource may be considered irreversible and irretrievable...." The statement on page thirteen that "Adequate storage will be available to store runoff from disturbed areas for the 10-year 24-hour precipitation event." does not provide a basis for great confidence when the reader encounters a statement later on page 70 which refers to "a period of disastrous rainstorms (which) closed mining operations

C



Mr. Ralph Driear
March 27, 1979
Page 3

during much of the 1920's." We hope that any permits granted for the mining operations will include requirements for utilizing all reasonable safeguards to prevent "irreversible and irretrievable" degradation of the quality of local water resources.

Sincerely,



David Cole, Chief
State Land Use Planning Bureau
DCA/Planning Division
(406) 449-3757

DC/ke

cc: Sherman Doucettee
Ms. Dolores Hughes



Response to David Cole, Department of Community Affairs letter

A. The further aquisition of land by the mining companies is currently proceeding at both locations. As land becomes available for sale in either the Zortman or Landusky areas, it is reviewed by mining company management personnel for possible purchase. It is therefore possible that land may be purchased at both sites, although, as the EIS discusses, the Zortman area is probably the most viable option for settlement.

B. As the draft EIS points out, (page 109) before approval of the proposed projects can occur, the plans of mining and reclamation must provide protective measures required by local, state, or federal law, regulations, or executive orders. The draft EIS contains those protective measures proposed by the mining companies as part of their mining and reclamation plans designed to meet the requirements of these laws. The draft EIS, in Chapter IV, also contains those additional protective or mitigative measures generally thought to have merit by the Department. It is further stated in Chapter IV that by the attachment of stipulations, these other measures may be required as part of the companies' reclamation plans in those instances where the permitting State or Federal agencies have the authority to do so. These additional measures, therefore, are presented in the EIS for consideration by the various decision makers. The Department's rules and regulations adopted pursuant to the Montana Environmental Policy Act provide for a minimum 15 day waiting period following issuance of the final EIS before Departmental action on the proposed permit can occur. At that time, those measures identified in Chapter IV, or through public input during the comment period that the Department determines should be required in addition to those measures proposed by the mining companies, will be included as stipulations on any permit granted. The final EIS, therefore, does not contain a formal determination of the entire program of protective measures that may eventually become a portion of any permit granted.

C. See response to comments U and V contained in the Charles Plumage Letter. Only the settling ponds at the mine pit sites would be designed to contain a 10 year, 24 hour precipitation event. These ponds would receive surface runoff from disturbed areas adjacent to the mine pits. In addition, the draft EIS states the following (page 75):

Both mine areas, however, are located very close to drain age divides and are not expected to intercept substantial amounts of runoff from undisturbed areas above the pits.



STATE OF MONTANA
DEPARTMENT OF FISH AND GAME
HELENA, MONTANA

Office Memorandum

TO : Bob Martinka
FROM : Dick Johnson
SUBJECT: Zortman-Landusky EIS

DATE: 3/28/79

We have reviewed the above-mentioned EIS and have the following comments:

A Bighorn sheep are more common in the Little Rockies than this report indicates. The minimum population level is 50 animals. This herd is reproducing and seems to have become established in the area.

The increased population associated with the proposed operation may be expected to increase poaching losses on bighorns, turkeys and elk. Each of these species is especially vulnerable to illegal harvest, and each is struggling to gain a foothold in the area. The overall increase in human activity and disturbance could have a similar effect.

Impact on Flora, Page 82: Past mining has caused considerable destruction of high meadow vegetation (balsam root-grassland). This type provides important nesting and brood-rearing habitat for blue grouse as well as feeding areas for all big game species.

Forty-five additional dwelling units will be built to house employees. These, and associated roads, could destroy additional habitat unless confined to the Zortman and Landusky townsites.

DJ/sd

cc: Dick Johnson



Response to Dick Johnson, Dept. of Fish and Game Letter

A. See response to Bob Martinka letter. Additional bighorn sheep population information was recently made available by the Department of Fish and Game and the Bureau of Land Management and is included in the supplemental winter wildlife report submitted to the Department by WESTECH Inc., Helena, MT.



STATE OF MONTANA
DEPARTMENT OF FISH AND GAME
HELENA, MONTANA

Office Memorandum

TO : Bob Martinka
FROM : Ken Knudson
SUBJECT: Landusky-Zortman EIS

DATE: 3/28/79

The potential exists at both mining sites for the development of acid-mine waste problems since:

- (1) Gold in the Little Rocky Mountains is often associated with pyrite (page 25),
- (2) The sulfide ore body is located beneath the oxide ore body proposed to be mined (page 36),
- (3) Past mining operations have encountered water at various levels and times (page 36), and
- (4) The groundwater system of the area is complex and not fully understood (page 79).

With these indicators in mind, I would suggest that the company submit rather complete plans outlining how they would properly treat an acid-mine waste discharge. Also, reclamation of acid-mine waste problems is difficult and costly; I therefore further suggest that the department consider this expense when setting the reclamation bond for both of these mining operations.

The sampling locations that are suggested for surface and groundwater quality monitoring appear to be adequate. I feel, however, that the sampling frequency of certain stations needs to be increased. The discussion of the fisheries resources of the area (a total of four sentences) was wholly inadequate. The discussion of the toxic potentials of cyanide solutions (pages 78 and 79) was very good and should be reproduced in any ensuing discussions of cyanide leach operations.

KK/sd



Response to Ken Knudson, Montana Dept. of Fish & Game Letter

A. The association of pyrite with gold ore in the Little Rockies occurs primarily in the sulfide ore bodies. Very little pyrite occurs in the oxide ore bodies proposed to be mined at Zortman and Landusky sites. Gold ore containing significant pyrite amounts does not generally provide a suitable heap leaching medium and is therefore not being proposed for mining.

The location of the sulfide ore body below the oxide ore body should not significantly increase the potential for acid mine drainage. Water will continue to percolate downward through the sulfide ore body, oxidizing it, continuing the existing process that has resulted in the creation of the oxidized ore body proposed for mining. The additional oxidation is not anticipated to adversely influence present groundwater quality because of the relatively small area that would be affected by the proposed mine pits.

As discussed on pages 36 and 79 of the draft EIS, the groundwater system of the area is complex and not fully understood. Basic groundwater flow from the mining area is thought to presently be exiting from the Gold Bug Adit (page 36, draft EIS). The proposed mining will occur above the levels drained by the Gold Bug Adit and is therefore not anticipated to significantly alter the base groundwater flow from the area. Exploratory drilling by the mining companies has encountered areas of limited groundwater in the levels above the adit discharge, however, none have been substantial enough to be considered a groundwater body (Max Botz, pers. comm.).

B. The Department has determined that based upon present information, the proposed mining project is not likely to result in the creation of acid mine drainage. Because of this, the mining projects are not required to comply with section 82-4-336(5) of the Hard Rock Law which requires the applicant to include in the reclamation plan provisions for the prevention and treatment of acid mine waters. Section 82-4-337(3) of the Hard Rock Law states the following:

(3) The operating permit shall provide that the reclamation plan may be modified by the board, upon proper application of the permittee or department, after timely notice and opportunity for hearing, at any time during the term of the permit and for any of the following reasons:

(a) to modify the requirements so they will not conflict with existing laws;

(b) when the previously adopted reclamation plan is impossible or impracticable to implement and maintain;

(c) when significant environmental problem situations are revealed by field inspection.

In accordance with these requirements, if the mining operation were



to result in the creation of acid mine waters. The Department could require a modification of the existing reclamation plan to include proper treatment facilities for the acid mine waters.

C. As explained in the draft EIS, the fisheries of the Little Rocky Mountains area is limited. Existing information regarding the condition of the fishery in those streams containing fish is not available. The Montana Department of Fish and Game, Fisheries Division, however, has indicated that the fisheries resource of the area is scheduled for an inventory in the near future. See response to comment D in Charles Plumage letter.

D. In addition to recent information that the Department has compiled regarding cyanide heap leaching and the potential for adverse resource impacts, other information regarding additional literature sources has been made available to the Department by interested individuals. The Department is continuing to compile information pertinent to the use of cyanide in mining operations.



STATE OF MONTANA



DEPARTMENT OF

FISH AND GAME

Helena, MT 59601

March 28, 1979

Mr. Ralph Driear, Environmental Administrator
Department of State Lands
Helena, MT 59601

Dear Ralph:

The draft EIS on the Proposed Plan of Mining and Reclamation, Zortman and Landusky Mining Companies, has been reviewed by our region 6 personnel at Glasgow and our Pollution Control Biologist, Ken Knudson. I have enclosed their comments for your consideration.

A My only comment pertains to the fact that the wildlife section does not contain a four-season wildlife survey, the winter season not being included. As I understand the situation, some winter wildlife data for the area have recently been collected by a consulting firm. However, the months of March and April will not be included. This does not seem to fit your requirements that a four-season wildlife survey be conducted on development sites such as this. Please correct me if my interpretation of this situation is incorrect.

Thank you for the opportunity to review this EIS and granting a portion of the time extension we requested.

Sincerely,

A handwritten signature in cursive script, appearing to read "Bob".

Robert R. Martinka, Chief
Bureau of Baseline Studies

RRM/sd
Enc



Response to Bob Martinka, Department of Fish and Game letter

A. Although neither the Hard Rock Law nor the Montana Environmental Policy Act require a four-season wildlife survey, the Department attempts to include all of the pertinent wildlife data possible within the draft EIS. Statutory time limitations within which the Department must take action upon a hard rock operating permit application (425 days) do not normally allow time to complete a full four-season wildlife survey and include the results in the draft EIS. In the instance of the Zortman and Landusky draft EIS, the draft EIS was able to include the results of a spring, summer, and autumn wildlife survey of the Little Rockies study area. The draft EIS (page 47) explained that a four-season survey was being completed, although only the results from the 3 seasons were able to be presented in the draft EIS.

Since the issuance of the draft EIS, the winter season wildlife survey has been completed. The winter informational supplement completes a four-season terrestrial wildlife survey for part of the Little Rocky Mountains (Phillips County, Montana) as conducted by WESTECH Inc., Helena, Montana. In addition, ungulate data for March, 1979 gathered by the Bureau of Land Management is included in this supplement.

A copy of the full wildlife survey reports prepared by WESTECH Inc. for the spring-autumn, and winter seasons is on file in the Departments' Helena Office. A total of 116 field days were included in the four-season study. The following is a summary of pertinent information regarding wintering wildlife observations obtained from the report.

Methods were described in detail in the three-season report (Scow, 1978). Data for the winter supplement was collected from aerial surveys, vehicle and pedestrian routes. There were three flights (one per month) over the study area during winter. Vehicle routes were limited to those roads where snow was removed to permit access, so that much of the routes described in the three-season report were inaccessible. Pedestrian routes were maintained, but were limited by deep snows, cold temperatures and short days.

1. Mule Deer

In the initial three-season report (Scow, 1978), it was hypothesized that mule deer would "migrate to the foothills and prairie surrounding the Little Rocky Mountains (to the south of the study area) where snow depths are not as severe, browse is more readily available, and solar radiation provides warmth: Open habitat types on south slopes (such as Gold Bug Butte at the Landusky site) are probably used if snow accumulations are not too great to impede mobility or limit browse availability."

"The mouths of major drainages (including Camp Creek, Goslin Gulch, Grouse Gulch, and Dry Gulch) are also used extensively. Rock Creek and Ruby/Alder Gulch probably receive less use because of their proximity and accessibility to Landusky and Zortman, respectively."



These suppositions proved generally true during the 1978-79 winter, although there were some exceptions. Direct observations of mule deer, as well as evidence (tracks and beds), indicated that some mule deer remained at higher than expected elevations during lengthy periods of subzero (°F) temperatures and despite two to three feet of snow. These areas included Gold Bug Butte (except the north aspect), the mid-upper reaches of Grouse Gulch, and both the east and west ridges above Ruby Gulch (Scow, 1979). However, most mule deer observations were from lower south-facing slopes and gulches along the mountains' southern perimeter.

Information obtained on the number of mule deer group sightings in various vegetation community types in the Little Rocky Mountain study area during the four-season wildlife study indicates that there were more winter sightings of mule deer from Ponderosa pine community types than from any other major habitat. The Ponderosa pine types accounted for eight of 14 (57 percent) winter sightings; this predominance of sightings is attributed to the fact that most Ponderosa pine types are at lower elevations.

Four of 13 (28.6 percent) winter sightings were from the lodgepole pine/mixed shrub community. These were the sightings from higher elevations discussed above, and it is believed that mule deer use of this community was influenced by the availability of browse in this type.

Two winter sightings were from the grassland community. These were the only grassland sightings during the study, and probably do not reflect the actual trend in year-round use of this type.

Mule deer distribution and habitat use data for March (John Grensten, pers. comm.) show no appreciable change from winter months. The animals were clustered at the southern periphery of the Little Rockies, despite a warming trend and rapid melt on south-facing slopes.

Information obtained on the average and median group sizes of mule deer observed during the study indicated that; in comparison with earlier seasons, group sizes generally increased through winter months as expected. The small number (10) of individuals observed in January did not accurately reflect average group sizes for that month. Larger groups of mule deer were undoubtedly missed during January. Caughley, Sinclair and Scott-Kemmis (1976) indicated that aerial surveys produce underestimates of animal density, depending on methods (speed, height above ground and transect width), terrain and vegetation. They suggested that such data may be better regarded as density indices rather than as density estimates. The greatest number of mule deer observed on the study area in any one day was 41 during an aerial survey in late February.

2. White-tailed Deer

The only white-tailed deer observations in the study area occurred



in December, with two sightings in the Pipo(Potr)/Syoc community type and one in the Pipo/grass type. During winter, white-tailed deer may be expected to frequent the dense cover of drainages at lower elevations, which is essentially their year-round habitat in the study area. Those observed in December followed this expectation with the largest group of ten venturing no higher than a foothill of about 4400 feet elevation in the Pipo/grass community type (Scow, 1979).

3. Elk

One observation (John Kalal, pers. Comm.) of two elk was reported in early February, in a lodgepole pine/mixed shrub community type on a south-facing slope immediately north of Gold Bug Butte (Scow, 1979). This was the only reported elk sighting during the entire four-season study, suggesting that elk numbers in the Little Rocky Mountains are not high.

4. Bighorn Sheep

Throughout winter, bighorns in the study area were observed most often in the mouth of Dry Gulch (Scow, 1979). They frequented an open Ponderosa pine/kinnikinnick type, where cliffs afforded protection to the south as did the steep drainage of Dry Gulch to the north. Smaller groups of mule deer shared the area in January and February. During aerial surveys, 13 bighorns were observed at that location in December, and 29 (including at least five large rams) in January. Twenty-one sheep were sighted at the same site from the air in February. It was impossible to satisfactorily determine age and sex of the sheep without imposing undue harassment. Faded red neck collars were occasionally seen on survivors from the 1972 and 1974 introductions. Also in February, two additional groups of sheep were spotted in the Pico/ mixed shrub and Pico/scree types on Saddle Butte (Scow, 1979).

In March, with warmer weather and snowmelt on south-facing slopes, big-horns dispersed along the southern perimeter of the mountains (John Grensten, pers. comm.), similar to mule deer.

5. Predators

Coyotes (or their evidence) were most frequently encountered on lowland plains and foothill areas during the winter months. However, one coyote was observed in lodgepole pine/mixed shrub habitat type near the summit of Gold Bug Butte on December 30 (Scow, 1979).

A ranch resident revealed that a female bobcat and two kittens inhabited the south flank of Thornhill Butte (a large solitary butte two to three miles southwest of the Little Rockies) during 1978 (Scow, 1979).

6. Additions to the 1978 Bird Species List

Two separate sightings of rough-legged hawks (Buteo lagopus) were



made in January on the prairie portion of the southeastern corner of the study area. A small group of five to six common redpolls (Acanthis flammea) were seen with mountain chickadees in Ponderosa pine near Zortman on February 13. Other bird species present in the Little Rockies study area over the winter (which were listed in the three-season report) were black-billed magpies, mountain chickadees and red crossbills, with more sporadic sightings of golden eagles, Clark's nutcrackers, black-capped chickadees and red-breasted nuthatches (Scow, 1979).

7. Impacts

The following discussion of impacts, as modified from that contained in the draft EIS, pertains to ungulates only. Impacts to non-ungulates are not expected to differ from those discussed in the draft EIS.

The proposed Zortman permit area does not appear to be winter range for any of the four ungulate species observed in the study area. The proposed Landusky permit area is winter range (for at least part of the season) for mule deer, and was used less commonly by bighorn sheep and elk. Gold Bug Butte may be used throughout the season during mild winters by all three species. However, due to its higher elevation, past and present degree of disturbance, and proximity/accessibility to Landusky, Gold Bug Butte does not seem to represent critical winter range, i.e., important to the continued survival of any or all four species in the mountain range (Scow, 1979).

Critical white-tailed deer winter range is the riparian/shrubby bottoms of draws, particularly in the southern perimeter of the study area, as well as beyond the study area boundary onto the prairie. As suggested in the three-season report (Scow, 1978), the entire southern perimeter of the Little Rocky Mountains is important winter range for mule deer and bighorn sheep. In particular, the southerly aspect of Sugarloaf Butte, the lower reach of Dry Gulch, and the west and southerly slopes of Silver Peak were used in the most severe part of the past winter. As winter mollified, Saddle Butte/Grouse Gulch provided some sightings (Scow, 1979).

Based on these observations, the impact of habitat loss within the two proposed permit areas is expected to be small. Impacts other than habitat loss to mining discussed in the draft EIS have the potential to affect ungulate populations of the area more than mining. Most important (and the most difficult to control) will be the location of the necessary additional housing units. The draft EIS states that, at full mine operation, there may be a need for approximately 45 new housing units. If the placement of these housing units were to occur on the winter range indicated in this report, it would be expected to have a negative impact to the ungulate populations.



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Fort Belknap Indian Community
A TRIBAL GOVERNMENT
Fort Belknap Indian Community
(Elected to administer the affairs of the community
and to represent the Assinibone and the Gros
Ventre Tribes of the Fort Belknap Indian
Reservation)

April 3, 1979
DATE

Mr. Leo Berry, Commissioner
Department of State Lands
Capitol Station Office
1625 11th Ave.
Helena, Montana 59601

Mr. Berry:

Your letter of March 28, 1979 concerning the comment period on the Draft Environmental Impact Statement for the Landusky-Zortman Mining proposal indicates that every effort will be made to include our comments if sent by April 4, 1979.

The phone conversation between LT. Governor Schwinden and you, Mr. Delmar Bigby and myself was to the effect that you would accept our comments if they were sent by April 4, 1979, and would be made a part of the record.

The Fort Belknap Indian Tribal Government is opposed to the re-opening of the Zortman-Landusky Mining operations. In order to supply the public with the necessary information we submit the following questions for response because the Draft Environmental Impact Statement does not adequately address the issues, and is grossly in-adequate in many areas.

A

1. Why wasn't a base-line study of the existing chemicals present in the Kings Creek area and Hays area conducted? The Fort Belknap Indian Tribal Government has been monitoring the stream and well water in Hays and has evidence of harmful chemicals in excess of the allowable standards.

B

2. Why are there no base-line studies of the volume and source of the ground-water done? The Fort Belknap Indian Community, by the Supreme Court Decision under Winters, owns "All waters rising upon, flowing through the Fort Belknap Indian Reservation. Failure to determine the volume and source of the ground-water is a violation of the rights of the Fort Belknap Indian Community.

C

3. Why aren't measures for the "Wild-Fire" protection covered? The Little Rocky Mountains has a history of forest fires and the D.E.I.S. does not address the very real possibility of wild-fire in the



4/3/79

mountains.

- D** 4. Why was no comprehensive study of the affect of the mining operation conducted on the fish population in the Little Rocky Mountains? Reference is made to a limited fish population in the Little Rocky Mountains but no study was conducted on why there is a limited population of fish.
- E** 5. Why wasn't the impact of the Little Rocky Mountain Mining Operation on the surrounding communities of Hays and Lodgepole not fully addressed? These communities are definitely affected by the proposed mining operations.
- F** 6. Why wasn't the off-road vehicle use not adequately addressed? What is the impact on the wild-life in the Mountains by the increased off-vehicle travel in the mountains?
- G** 7. What is the impact of the mining operations on the existing and on-going pollution from the mine tailings of the Little Ben and August Mines in Section 15, T.25N-R.24E in the Little Rocky Mountains? No reclamation of past mining operations has been done.
- H** 8. The effect of the mining operations on the C.M. Russell Wildlife Refuge has to be addressed because of the effect on the waters flowing south into this refuge.

Sincerely,



Charles D. Plumage, Chairman
Fort Belknap Indian Community

cc: Cecil Andruss
Secretary of the Interior
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Thomas L. Judge, Governor
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REPLY TO DRAFT ENVIRONMENTAL IMPACT STATEMENT

ZORIMAN-LANDUSKY MINING OPERATION

BY: FORT BELKNAP INDIAN COMMUNITY

INTRODUCTION

The Little Rockies have been called "The Island Mountains" by our Indian people. This beautiful and isolated range is an oasis in the midst of hundreds of square miles of dry high plains and breaks.

In the Draft EIS (p. 72), the researchers claim that:

"The natural and aesthetic resources of the Little Rocky Mountains have been heavily influenced by mining activities. The large amount of road construction, exploration, and mining disturbance, and tailing piles have reduced the visual resources of much of the area. The old townsites, mill sites, and other remnants of the mining history of the area, however, may offer an aesthetic visual appeal to those persons who enjoy these features."

We find this statement to be misleading and ironic in several ways. Such a statement in an EIS is an attempt to give the public the impression that, "it is already ruined, so why not continue to ruin it." We see the mountains in a different light. The greater portion of the land in the Little Rockies is in a primitive state. Spectacular limestone cliffs, window arches, steep canyon walls, hidden valley meadows--These are the visual resources of much of the range. To say that old mine remnants, etc. may be the only redeeming visual features of this country is not only quite warped, but also highly disrespectful.

We feel that our lives are profoundly connected to these mountains. There are sacred grounds up there. Our young men went to the higher



peaks on their vision quests. Our elders still make seasonal trips into the mountains to collect medicinal plants, or to participate in important ceremonies. Our young people need what wild country they can still find as a source of pride in their home land.

The re-opening of the mines would be very untimely for our people. There is a cultural renaissance taking place among our youth. Most of our population is young, and sees these mountains as a key place to go to to understand our cultural heritage. These young people need pure water to drink, fish and game without toxic chemicals in their flesh, and a quiet place to go, free from the dynamite and bulldozers. These mountains are not a large range, and pit mining will have a proportionately great affect on the country. It is only several miles away from our communities and an isolated eco-system such as this is subject to more severe disruption than larger wild areas.

MEPA requires an approach that takes into account the long range and sociological effects that any proposed activity will have on an area and its people. The Draft EIS fails to grapple with this aspect of the law.

The following list gives some quotes by our people concerning the proposed mining:

"I don't see how any mining in our mountains could benefit the people here."

"When a lot of miners come into our mountains and run around in them, it will be like the old days when they came and raised Cain with our home. Next thing you know they will be trying to take all of our mountains and will leave nothing for us."

"Why can't the white man leave us alone with what little we have left. First they take our families then our



THE DRAFT EIS FOR THE PROPOSED PLAN OF MINING AND RECLAMATION
IN THE LITTLE ROCKY MOUNTAINS

is severely inadequate and the described mining operations are totally unacceptable to the people of the Fort Belknap Indian Reservation. A complete revision of this EIS will be necessary if the public is to be properly informed of the consequences of the proposed mining operation. The draft EIS is in violation of MEPA, and much of the study process must be repeated in a competent and unbiased manner before the public can respond to the statement. The following areas represent deficiencies in the draft statement and in the proposed mining plan:

1. Inadequate and incompetent testing and sampling.

Stream and well-water samples were taken only once during the entire 1978 study period. One sampling of these usable waters in the Zortman-Landusky areas does not allow anyone to understand the baseline chemistry of the water supply system. King Creek, the major north-flowing drainage from the Landusky mining area, was somehow overlooked. Yet there are more people affected by this particular drainage than any other in the study area. The toxic substances which are most critical to the public are, unfortunately, omitted from the list of one-time test results. When arsenic appears in the table (page 37), it is shown at .19, an unsafe level according to U.S. government standards. The only reading for arsenic appears at the Gold Bug Adit Discharge. No other readings can be found on that page, and only four are shown in the following page. Cyanide, a key substance in question here, is also omitted in half the study cites, especially those draining onto Indian



land. Lead and cadmium were not even listed, yet a recent study shows that lead in Little Peoples Creek exceeds the maximum for safe drinking water by one thousand two hundred times! See Appendix "A".

K The study concludes that "no significant impact is anticipated to occur to the areas fishing, because of the general lack of a fishery in the area of the proposed operation." Little Peoples Creek was a major fishery prior to cyanide poisoning by the last mining operations. The stream was and still is an important source of food and recreation for the Indian community. The stream's system was once a thriving aquatic community and has been re-established as a fishery in the Little Rockies. The circumstances surrounding fishing in Peoples Creek should be included in the final EIS. In addition, the status of the aquatic insect life must be examined in all of these areas. Since acid mine waste could occur, it is necessary to discuss the effects of the mining on King Creek and Little Peoples Creek. The sampling and testing did not take into account the stream flow areas which we at Fort Belknap consider to be of prime concern.

2. Lack of proper baseline study.

L The information presented as a "Baseline Study" is not scientifically valid. While there is a checklist (laundry list) of vegetation and animal species present in the two mining areas, there is no baseline study for chemical analysis of any plant or animal specie. Therefore, when an impact occurs from the mining or leaching operation, the causal effect relationship, will be difficult, if not impossible to establish. Ground water flow is unknown, and there is no idea of the availability



of ground water for the demands by both mining operations and the increased domestic consumption by the mining communities. The theory explained in the EIS, Page 36, states that the ground water "generally follows the land surface towards the stream bottom", and that the destruction by mining has probably altered the flow into and through the mine adits.

M Considering the locations of the mines, we contend that the ground water use by the mines will affect the water supply of Hays and Lodgepole. In a dry region such as ours, any greatly increased water consumption by the mines will, at best, reduce our legally protected water supply; and at worst, both pollute and reduce our water. A serious baseline study of the ground water is imperative before any renewed mining activity is allowed in the area. The EIS further states (page 80, second paragraph) no feasibility study has been conducted to determine if adequate ground water exists for use by both the proposed operations and the residents of Zortman and Landusky." The researchers never even considered the possible impact on the Indian community's water. It is inconceivable that such a drastic use is being planned for a water supply whose source, direction, and ultimate volume, is admittedly unknown. A proper wildlife **N** baseline study must be conducted during all four seasons, yet the researchers fail to include a winter study. It looks to us as if the mining company is in too much of a hurry to get under way and profit at the expense of our wildlife and environment.

3. Failure to cite literature on important ecological problems.

O There is a total lack of adequate research of scientific literature on the potential environmental hazards of cyanide and the cyanide leaching



process as it relates to environmental impacts to all terrestrial ecosystems. See Appendix "B". For example, in the literature cited section of the EIS, pages 131 to 133, there are only three references dealing with the toxicity of cyanides and related compounds. Each of these three papers is by the same major author and each only addresses cyanide toxicity to fish. Even a brief search in scientific literature discloses that cyanide and some of its compounds were used extensively as non-selective herbicides and insecticides. Nowhere in the draft EIS is there any information on these subjects. Furthermore, in 1976, the U.S. Department of Health, Education and Welfare published a 191 page criteria document on recommended standard occupational exposure to hydrogen cyanide and cyanide salts. This document adequately covers the real and potential problems of cyanide poisoning associated with individuals utilizing cyanide compounds. Since at each of the two proposed mining sites approximately 500,000 pounds (250 tons) of cyanide will be present in the leaching ponds, it is imperative that this aspect of human health be examined. It should have been covered in the EIS by either personnel of Montana Department of Health and Environmental Sciences or the Department of State Lands, but was not. In addition, there have been nine annual project reports on the U.S. Fish and Wildlife Service's fishery management program in this specific area as well as throughout the entire reservation. These bound reports have always been available to the public, yet no mention was made of them in the DEIS.

We challenge the validity of the research literature cited in this



EIS. For example, page 80 "U.S. Bureau of Mines" states that "heavy metals, cyanide salts are known to persist for several years, but residual free cyanide in abandoned heaps is believed to exist no more than one month." Our own tests show very high levels of cyanide and heavy metals such as lead in both abandoned tailings and surface run off streams thirty years after heaps were abandoned. See Appendix "A".

4. Proposed safeguards are insufficient.

- A) No continuous monitoring is proposed for the leach-pad cite-- leakage would have to be "recognized" (page 78 EIS) by the mine employees.
 - B) Ground water monitoring is impossible, since flow is unknown.
 - C) Proposed frequency of monitoring is unacceptable; the water in most areas, could be polluted for up to a year before the problem was even detected. (see EIS appendix A) Monitoring of King Creek and Lodgepole Creek is not included as part of the monitoring program.
 - D) Shallow five to eight foot holes dug with a backhoe do not constitute a ground water monitoring well.
 - E) A requested discharge permit pre-empts the positive arguments for a closed system. Also, who would determine "an emergency" necessitating a discharge?
 - F) Page 77, last paragraph explains, in effect, that a torrential summer rain storm (not uncommon in our country) could create an uncontrollable pollution problem.
5. Reclamation information is vague.



W

A two page summary concerning the reclamation of this complex mountain terrain is insufficient for use by the public as an evaluation tool. There has been no reclamation of previous mine sites, and it should be noted that the old tailings and heap areas have failed to hold vegetative cover even after thirty years. There is no proof that the area can in fact be reclaimed, and concrete evidence should be required before allowing the mines to reopen. Montana Code Annotated (M.C.A. 1978) 82-4-336(1) states: "(1) The reclamation plan shall provide that reclamation activities, particularly those relating to control of erosion, to the extent feasible, shall be conducted simultaneously with mining . . .". "To extent fesible" in ^{the} immediate case must be interpreted to mean simultaneously. There are existing heap areas that can be used immediately to test any reclamation activities that are proposed for

X

some later date. The reclamation plan on page 16 of this DEIS therefore does not meet the requirements set forth in the Hard Rock Act M.C.A. 824 336(1) (1978). If the area is not reclaimed the long term affects on our Indian land, and people, and adjoining C.M. Russel Wildlife Refuge, will be serious and we insist on evidence that the area can be reclaimed. If a normal plant community is not re-established in the pit mine areas, there will be continued erosion and pollution of our country.

6. No explanation of the effects of toxic substances.

Y

Cyanide is mentioned as a potential hazardous substance associated with the mining. But lead, cadmium, or other harmful elements are not mentioned in the EIS. Proper research would have indicated that there is a serious problem with lead and arsenic in this area, and its direct



connection with the mining should be made clear to the public in an EIS.

7. No air quality survey.

AA Z An air quality survey is an important component of a true baseline study. Although the most serious form of pollution would likely be water and soil disruption, the wind-carried cyanide could have an effect on the local environment. We know that cyanide in this vaporized form can be used both as a non-specific herbicide as well as an insecticide. Serious problems with pollination and vegetation dependant on pollination could occur. Research indicates that within a two to three mile area of Zortman there are five honey bee yards (Apiaries), with forty to fifty colonies per apiary. Honey bees are extremely sensitive to cyanides and are excellent bio-indicates of this poison.

8. No alternative mining methods proposed.

AA The methods mentioned in the context of Section C page 125 "Alternative Technology" are not alternative methods, since none of the three alternatives listed would be acceptable to the mining companies. The mining companies are saying in effect: "It is either cyanide leach pit mining, or no mining at all." The one half page of supposed alternatives is only giving lip service to MEPA's requirements, and to the public's concern.

9. Failure to assess total social impacts.

It is quite inappropriate for the writer(s) of the DEIS to intimate that our people's reaction to mining is merely a result of misinformation or lack of information (see page 67). For years we have had to face the degradation from the previous operators. The supposed reclamation plan



offers no specific alternatives to what we have had to deal with in the past. In fact there are admissions that the yet unexplained reclamation efforts might not be successful. We still have good reason to be suspicious. The DEIS writer's flippant comments about our tendency to lump all mining companies in a negative stereotype was not an honest appraisal of our expressed concern.

BB

The researcher(s) went to length to discuss the impacts on the Phillips County. Concern over school facilities for miners' children, etc., represented a careful evaluation of the social and economic impacts on Phillips County. But the researcher(s) failed to take this study to its logical conclusion: To evaluate the impact on the Indian community which is so obviously affected by these mining areas. A look at a map of Montana will illustrate this point.

CONCLUSION

A non-essential resource is not worth risking the health and well-being of our Indian people. Degradation of Indian lands by profit seeking non-Indians must stop somewhere. The land and water of the Little Rocky Mountains are all our people have left. Please understand that we must cherish and protect our home. Do not allow the Zortman and Landusky mines to re-open.



Response to Charles Plumage Letter

A. Water from King Creek was sampled above and below the tailings and at the Fort Belknap Indian Reservation Boundary. The results of these samples are presented in Table II-3 of the Draft EIS, and in the hydrology technical report prepared by WESTECH Inc. No additional impact on the existing quantity or quality of water in King Creek is expected from the proposed mining operation. Any surface water discharged from the mining operation will be regulated by the Montana Pollutant Discharge Elimination System which prohibits pollution of any waters of the State of Montana.

B. Based on present geologic and drilling information the proposed mining should have no adverse impact on the quantity or quality of groundwater rising upon or flowing through the Fort Belknap Indian Reservation. Water supplies will be taken from the Gold Bug adit effluent and from Alder Gulch. Both these water sources are far from the Indian Reservation and the possibility of impacting the groundwater on the reservation while it cannot be ruled out, is considered remote.

The groundwater and geologic systems of the area are complex and not well known. A comprehensive study of the volume and source of groundwater designed to yield comprehensive results would both be extremely time consuming and costly. Statutory financial and time limitations inherent in the EIS process did not allow for conducting a comprehensive study of this nature.

C. A discussion of the potential for, and mitigation of wildfire can be found on pages 83, 115, and 17 of the Draft EIS. Page 83 states the following:

Increased fire hazard may be significant. The Little Rockies are susceptible to fire and have a definite fire history. Large scale conflagrations would likely cause more environmental impacts than the proposed mining and leaching operations.

D. The relation of the areas containing the limited fish populations to that portion of the mining operations having the greatest risk to the fisheries (the leaching facilities) is such that a detailed study of the condition of the existing fisheries was not considered pertinent. In discussing the potential threat to fish that a spill of leakage of toxic substances would pose, the draft EIS states the following on page 79:

The relation of pH levels to the dissociation and toxicity of the metalocyanide complexes to fish and other aquatic life is very important. The influence of snowmelt in the area of the proposed leaching facilities could be reasonably expected to seasonally lower the pH levels of the ephemeral surface waters to 6.5 or lower. Should a spill of the process waters containing the metalocyanide complexes occur at such a time, there would be an increased potential for an adverse



toxic impact to any aquatic life found in the waters receiving the spill or discharge. It must be remembered, however, that free cyanide in water converts to the much less harmful cyanate within a short distance of its introduction. The lack of any perennial surface waters in close proximity of the proposed leaching facilities, and the further lack of any substantial fisheries in these waters, make the potential for a significant toxic event to the areas surface water systems slight.

Undoubtedly, should an unanticipated spill, discharge, or seepage of toxic substances involved in the mining project enter waters containing fish and result in fish mortalities, or chronic impacts to the fisheries, the existing limited characteristic of the fisheries would add significantly to the magnitude of the impact.

E. The impact statement does not attempt to differentiate between the reservation and other lands when discussing the potential for impact to natural systems. The impacts are discussed in the context of total systems, as the functioning of natural systems does not recognize political boundaries.

Zortman, Landusky, and Malta are those local communities that will experience an influx of additional residents, and therefore the greatest impacts related to the proposed projects. The primary discussion for social and economic impacts in the draft EIS, therefore, focuses on these communities. Reservation lands were not considered open for an influx of a mining related population. However, specific references to potential social or economic impacts to reservation communities can be found on pages 89, 92, 93, 94, and 101 of the draft EIS. In addition, the general discussion of impacts for the surrounding area, found throughout the remaining draft EIS discussion, can be applied to adjacent reservation lands in most cases.

The consulting firm of John Short and Associates, Inc. which prepared the social and economic analysis used by the Department in the preparation of the draft EIS states the following:

Regarding impacts on Hays and Lodgepole, although the communities could potentially experience natural systems effects, the likelihood of any significant social or economic effects due to the mining activities is remote. Firstly, maximum possible employment of local labor would only extend to some thirty persons. Secondly, it was our distinct impression that no great magnitude of interaction takes place between the communities of Hays-Lodgepole and Zortman-Landusky.

F. A discussion of off-road vehicle use can be found on pages 83, 86, and 101 of the Draft EIS.

G. The proposed mining plan will not add to, nor benefit the existing conditions that may be present as a result of past mining activities.



H. No impacts from mining or processing are anticipated in any streams flowing south to the C. M. Russell Wildlife Refuge. Existing streams, Ruby Gulch and Rock Creek, are intermittent streams and are over 10 miles from the refuge.

I. A discussion of the "long range and sociological effects" can be found on pages 90, 100, 101, 102, 105, and 119 of the draft EIS.

J. Table II-3 in the draft EIS represents typical water quality from the area. Complete water quality data representing additional sample episodes for several stream sites and wells is contained in the preliminary report entitled "Water Resources of the Zortman-Landusky Mining Areas" prepared by WESTECH Inc., and on file in the Department's Helena office. Emphasis on an increased sampling frequency and additional chemical parameters was placed on those areas with the greatest risk to be directly affected by the proposed projects, i.e. those areas adjacent the proposed processing facilities. Indian lands are not adjacent these facilities and therefore were not as intensively sampled. King Creek was sampled at the spring site in the upper tailings, and at the reservation boundary, and again at the road crossing. Results of these samplings are found on page 39 of the Draft EIS.

K. See responses to comments by Ken Knudson, Montana Department of Fish and Game.

L. The major threat for impacts to the area's plant and animal species is not from chemical contamination, but rather physical disruption or destruction caused by the construction and operation of the proposed mining project, as well as the threat for wildlife harassment by increased human presence in the area. Because of this, and the statutory time and financial limitations present in the EIS process, a baseline study of the chemical analysis of area plant and animal species was not considered the best use of the resources available.

M. Without additional detailed hydrologic data, the potential for an influence upon the water supply of Hays and Lodgepole as a result of water consumption by the mining proposals cannot be completely ruled out. All existing hydrologic data, however, indicates that the risk is remote. The well water use by the Zortman mining operation would utilize an existing well water appropriation at the site of the old Ruby Mill well.

N. See response to comments by Bob Martinka, Montana Department of Fish and Game.

O. See response to comment L. A review of the literature contained in "Appendix B" indicates very little in the way of useful information pertinent to the proposed operations and terrestrial ecosystems.

P. A review of the literature indicates that application of cyanide compounds formerly used as herbicides and insecticides normally required



specialized conditions and in amounts greater than would be potentially encountered in the proposed mining operations. In response to a request by this Department for additional information regarding the potential for cyanide impacts on vegetation and wildlife, the Pesticide Division of the Montana Department of Agriculture supplied the following reply (3/23/79):

Regarding the DEIS on the Zortman and Landusky Mines, a thorough search of our literature has revealed little toxicological data concerning the effects of cyanide on vegetation. It is my feeling that the proposed operation, in terms of cyanide usage, represents a minimal hazard to vegetation and animal life under normal operating and expected environmental conditions.

Q. A discussion of the hazards to employees of the operation from cyanide are discussed on pages 73 and 74 of the draft EIS. Cyanide volume in the pregnant process water pond at each operation would be about 500 pounds while about 166 pounds would be present in the barren solution pond at any one time, not 500,000 pounds.

R. The results of your tests confirm the U.S. Bureau of mines statement that "heavy metals, (and) cyanide salts are known to persist for several years". The test results by EERC for cyanide in the mine tailings and Little Peoples Creek submitted as Appendix "A" do not represent "free cyanide", and therefore do not conflict with the U.S. Bureau of Mines statement that "free cyanide in abandoned heaps is believed to exist no more than one month". The tests for cyanide completed by EERC were done using a standard "Cyanide Distillation" method which involves the use of acid solutions in the laboratory. The results therefore represent the amount of cyanide freed under laboratory conditions from complexed cyanide, and not the amount of free cyanide present in the tailings or stream (John Murray, EERC, pers. comm.). Some complexed cyanides, however, are thought to be potentially, and partially soluble under variable natural conditions. It is therefore possible that a very small (insignificant) portion of the measured cyanide can be "free cyanide". As discussed on page 78 of the draft EIS:

Cyanide, to remain as cyanide in the solution, requires a pH of 10 or greater. Below a pH of 10 the cyanide is converted to cyanate, considered to be about 1/1000th as toxic as cyanide. . . Cyanates may persist in water for a long time but are subject to hydrolysis yielding ammonium and carbonate ions.

S. The schedule for monitoring of ground wells at the proposed heap leach sites is contained in appendix A of the draft EIS. Shallow monitoring wells would be checked weekly for water levels. If water were present, it would be sampled for a complete analysis plus cyanide. The Montana Hard Rock Law has no provisions for requiring either the operator or the Department to determine groundwater flows or conduct groundwater monitoring



before, during, or after operation of the proposed facilities.

T. See reply to comment S. The emphasis in monitoring of the area's water resource is placed upon the monitoring well systems proposed at each facility. If the frequent monitoring of these wells reveal a potential seepage problem, the area's surface water systems will be sampled more frequently.

U. The draft EIS erred in stating that "since the capacities of the Teaching solution ponds and emergency storage ponds are designed to hold a 10 year 24 hour precipitation event, MPDES permits will be applied for. . ." the designed capacity of the process and emergency storage ponds is to contain a 100 year, 24 hour precipitation event, and MPDES permits are not being applied for for these facilities. MPDES permits will be applied for only for the sedimentation ponds at the facilities and mines which are designed to hold a 10 year, 24 hour precipitation event. Although a discharge permit is required, (an "emergency") a discharge resulting from a precipitation event greater than a 10 year, 24 hour event would not be subject to effluent limitations. Determination of whether the discharge was a result of a precipitation event of that magnitude would rest with the Water Quality Bureau, Department of Health and Environmental Sciences.

V. The rules and regulations promulgated pursuant to the Hard Rock Act require that the process water ponds be equipped with spillways or other devices which will protect the impoundment structure against washouts during a 100 year flood. Since the process water ponds are designed to accomodate a 100 year, 24 hour precipitation event, as well as withstand a 100 year flood, only events greater than these, or the occurrence of several major precipitation events in close sequence would result in a discharge from these ponds. If the discharge were to be eminent, the addition of calicum hypochlorite or other appropriate oxidizing agent, as discussed on page 7B of the draft EIS, would be an effective means of reducing the toxicity of the discharge. In addition, to prevent a discharge during this type of event, the emergency storage ponds were designed to receive pumped flow from the process water ponds, thereby increasing the effective storage capacity of the ponds containing the process waters.

W. No reclamation has been attempted on the existing mining disturbances in the Little Rockies. A comparison between the lack of reclamation on existing areas that were not subjected to reclamation techniques and management, with the potential for reclamation success at the proposed facilities is not pertinent. Pursuant to section 82-4-351 of the Hard Rock Law, the Department, in taking action upon the permit applications, must determine if the proposed reclamation plan provides an acceptable method for accomplishment of reclamation as required by the law.

X. Rule 5, Section I of the Department's rules and regulations adopted pursuant to the Hard Rock Law sates the following:



Reclamation shall be as concurrent with development or mining operations as feasible and must be completed within a specified reasonable length of time. Revegetation must be accomplished in the first appropriate season after necessary grading, in accordance with accepted agricultural or reforestation practices.

Unlike coal strip mining, hard rock open-pit mining is generally not conducive to any significant amount of reclamation activities during the active mining operation.

Y. Cyanide is the major chemical contaminant of concern in the proposed operations. Although lead and cadmium were not specifically addressed, they are considered as a portion of the "metals" contamination potential for the proposed projects. Since the ore body being utilized is the oxide ore body, the potential for "metals" contamination is considered significantly less than present for the sulfide ore body. Post mining of portions of the sulfide ore body may be contributing to the presence of increased amounts of these metals in the areas water resources. There is no connection between the proposed operations and the extent to which existing chemical contaminants may be affecting the environment of the area. A discussion of the potential impacts to the water resources of the area, including cyanide, heavy metals, and cyanometallic complex contamination can be found on pages 76 through 81 of the draft EIS.

Z. Literature indicates that honey bees are excellent bio-indicators of free cyanide contamination. The office of the State Apiculturist had indicated that commercial honey bee hive sites are currently located in several areas near the Little Rocky Mountains. The nearest of these hives is approximately 6 miles from the proposed cyanide leaching sites. The office stated that although honey bees may have a forage range of 3-5 miles during unfavorable blossom years, the risk of adverse effects to the existing hive locations from the cyanide leaching operations would be insignificant (Willard Kissinger, State Apiculturist pers. comm.). Should the honey bees forage in the area of the proposed facilities, the greatest risk for adverse effects on the bees would be caused by the process water ponds containing cyanide. Contact with this water would probably result in mortality to the honey bees, as well as other members of the wild bee family using the areas for foraging.

AA. Section C, page 125 of the draft EIS adequately discusses the alternative methods of mining and processing available to the mining company. Mining operations, as with any commercial venture, cannot operate with methodologies that are not economically feasible to implement. The proposed mining operations are especially limited in this regard because of the geological structure of the oxide ore body, and the low grade ore present in the ore body. The EIS points out that it is because of these factors that alternative mining or processing methodologies that may be feasible in other mining ventures are not economically feasible for the proposed operations.

BB. See response to comment F.





University of Montana
Missoula, Montana 59812

M E M O R A N D U M

DATE: March 28, 1979

TO: Leo Berry, Commissioner of State Lands

FROM: C. C. Gordon, Professor of Botany

RE: Draft Environmental Impact Statement on Proposed Plan of Mining for the Zortman and Landusky Mining Companies in Phillips County, Montana

This draft is basically a totally deficient document in relating to the citizens of Montana the serious environmental problems associated with proposed mining and the cyanide leaching process. It does not contain either an adequate literature review of scientific knowledge on the problems of cyanide leaching nor baseline studies on existing toxic elements and compounds currently existing in the water supplies of the Fort Belknap Indian Reservation and the Charles Russell Refuge. I, therefore, request that the following information be gathered by personnel of the Department of State Lands and presented in the final Environmental Impact Statement.

- A 1. In addition to gold and silver, what other trace elements in the mined ore of the Zortman and Landusky operations are leached by the cyanide processes?
- B 2. What are the current concentrations of lead, arsenic, cadmium, and cyanide in all running waters originating in the immediate vicinity (3 miles) of the two proposed mines which flow either north to and/or through the Fort Belknap Indian Reservation or south to the Charles Russell Refuge?
- C 3. What are the current concentrations of lead, arsenic, cadmium, and cyanide in the tailings of all former mining efforts of this area which can be leached by precipitation with a pH of 3.5?
- D 4. What are the current concentrations of lead, arsenic, cadmium, and cyanide in the bottom sediment, aquatic insects, aquatic vegetation, and fish of all running waters originating in the immediate vicinity (3 miles) of the two proposed mining areas?



- E** 5. Are these concentrations of lead, arsenic, and cadmium in fish at levels which allow them to be consumed for human consumption according to all federal and state laws?
- F** 6. Was a literature search made by personnel of the Department of State Lands for the current available scientific knowledge on the environmental problems originating from the excess of available lead, arsenic, cadmium, and cyanide in either aquatic or terrestrial ecosystems?
- G** 7. Did this literature search also include a search for the past problems of the cyanide leaching process in the U.S., Canada, and Europe?
- H** 8. What are the names, academic training, and experience of all individuals participating in the preparation of this EIS?
- I** 9. What are the total amounts of cyanide to be utilized by each mine leaching process if the mining activities were to continue for 2, 4, 8, 16, 32, and 64 years?
- J** 10. Since the amount and origin of ground waters in the vicinity of the Zortman and Landusky mining areas are not known, according to the draft EIS, how do personnel of any state agency allow for any further use for the mining process and still protect the current users?
- K** 11. What safeguards and monitoring processes are contemplated by state agency personnel to ascertain the problems of cyanide spillage contamination if and when the mining process is started?
- L** 12. What are the benefits to society if gold is or is not removed?
- M** 13. What are all of the alternative methodologies which could be utilized in extracting gold and silver from the ore bodies of the area?
- N** 14. Please list the requirements of the Hard Rock Mining Act and MEPA which were and were not fulfilled in this draft EIS.



Response to C.C. Gordon, Professor of Botany, University of Montana
Letter

A. Chemical characteristics of water contained in the barren and pregnant ponds are listed in the draft EIS (Table II-3). Leaching with cyanide involves addition of lime to maintain the leach solution at a pH above 10. Under these conditions a number of hydroxide and cyanide compounds can occur in the leachate. For this reason the leach solutions are isolated from natural waters to prevent water quality problems. The oxide ore that is leached contains many minerals and trace elements including small quantities of gold. Some trace elements and compounds are removed from the heaps during leaching but are subsequently redeposited in the leach either as particulates or as insoluble compounds. Many metals including iron, copper, lead, and cadmium commonly are relatively insoluble in high pH solutions whereas others are soluble. As discussed in the draft EIS, the amounts and form in which trace elements may be leached during the heap leaching process is not well understood and is just recently being subjected to further scrutiny. This is primarily because past knowledge on leachate composition has been based on precious metal recovery, not trace elements or their complexes. Future monitoring of the leach system by the mining companies to refine and improve the efficiency of the recovery process would yield further information on trace elements in the barren and pregnant pond waters, however, containment emphasis would continue to be on cyanide and zinc which are known toxic substances of major concern.

B. See response to comment H and J in the Charles Plumage Letter. In addition, the mining companies will be adding lead and cadmium to the list of chemical parameters to be tested during the spring 1979 water quality monitoring program.

C. A number of areas contain mine tailings in the Little Rocky Mountains with King Creek and Ruby Gulch being sites of major historic tailing accumulation. The proposed mining plan does not involve disturbance of any of these tailings. No tests using precipitation with a pH of 3.5 or other leaching tests were conducted on these tailings.

D. See response to comment L in the Charles Plumage letter.

E. See response above D.

F. See response above and response to comment D in the Ken Knudson Letter. Yes, however, excess lead, cadmium, and arsenic were not considered to be a potentially significant threat as a result of the proposed mining operation as these elements are not thought to be present in the oxide portion of the ore body in significant amounts.

G. Yes, for those recent operations with comparable technology.

H. The following list contains the names and qualifications of those individuals who participated in the preparation of the draft EIS for the proposed operations of the Zortman and Landusky mining companies.



Department of State Lands, Helena, Montana

Ralph Driear, Environmental Administrator
Bob Spinney, Assistant Environmental Coordinator
Steve Anderson, Hard Rock Mining Inspector
John Herrin, Environmental Coordinator

WESTECH Inc., Helena, Montana

Bob Rudio, Geologist
Patrick Farmer, Wildlife Biologist
Dean Culwell, Range & Forest Ecologist
Dwight Bergeron, Wildlife Biologist
Ken Scow, Wildlife Biologist
Mark Rudio, Vegetation Specialist
J. Art Olsen, Soil Scientist
Connie Cole, Researcher
Ambry Gartner, Hydrologist
Max Botz, Hydrologist/Engineer
Tom Wing, Engineer
Dick Krott, Draftsman

John Short and Associates, Helena, Montana

Lisa Anderson, Sociologist/Economist
Jim Boyer, Sociologist/Economist

Mineral Research Center, Butte, Montana

Lynn B. Fredlund, Principle Investigator, Research Archeologist
Bonnie Hogan, Project Director
Tim McGinnis, Field Assistant
Jill Thompson, Field Assistant

Western Interpretive Services

Robert Murray, Historical Consultant
Larry Hoffman, Historical Mining Engineer, Consultant

Additional participation and assistance were obtained from many sources. Zortman and Landusky Mine Companies provided data and information on their proposed activities, as well as numerous visual aids. Comments of residents of the area and others were especially helpful in the preparation of this document.



I. Cyanide consumption for the proposed operations has been estimated to be approximately one-half pound of cyanide per ton of ore leached. The annual consumption of cyanide, therefore, for the combined operations, using the long term goal sustained average annual amount of ore leached would be approximately 500 tons (Hank Scholz, pers. comm.).

J. See response to comment D in the Bureau of Land Management letter.

K. In addition to the water quality monitoring program proposed for the monitoring well systems at both mining projects and the area's surface waters (Appendix A, draft EIS), Department inspectors would inspect the mining properties a minimum of 4 times annually. During inspections, Department personnel would be checking for evidence of past, present, or imminent spillage of cyanide, or other reagents and process waters. They would also be observing the storage, handling, and use of the cyanide and other chemicals. If the inspectors felt it necessary to take additional water samples, they have been trained in the proper sampling techniques. A discussion of the federal and state regulations regarding the disposal of hazardous wastes, such as might be required in the event of a spill can be found on page 112 of the draft EIS.

L. Gold, in addition to its value in the economic system of the U.S. is today widely used in home appliances, precision instrumentation, and aircraft, as well as an important contributor to the space program. If the gold were not mined, those natural and social amenities currently present in the area that have been identified as having the potential to be significantly adversely affected should mining occur as proposed, would retain a status quo (assuming developments other than mining also did not occur in the area).

M. A discussion of alternative technologies available to the mining companies is discussed in pages 125 and 126 of the draft EIS. The available alternative processing methods for the proposed operation are limited by 1) the low grade ores involved, and hence the economic feasibility, 2) the occurrence of silver which is a significant value in the ore to be mined, and 3) the topography of the area.

N. The Hard Rock Law does not require that a draft EIS be written for the proposed mining operations. A list of those individuals involved in the preparation of the draft EIS was inadvertently omitted from the EIS and can be found in response to comment H of this letter. All other environmental analysis requirements of MEPA have been fulfilled in the draft EIS.

